

### **REMARKS**

Claims 1-47 are all the claims presently pending in the application. Claim 35 has been amended for a minor grammatical error.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-5, 10-16, 21-23, 34, 37, 39, 46, and 47 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,563,185 to Modell et al. As best understood, the claims unidentified in this listing are also intended to be rejected as unpatentable over Modell.

These rejections are respectfully traversed in the following discussion.

#### **I. THE CLAIMED INVENTION**

As described and as defined in, for example, independent claim 1, the claimed invention is directed to an apparatus for producing a modulated optical signal in a waveguide, and includes an antenna for communicating with the waveguide and with an externally-applied optical field and having an output port. An electrically-variable-impedance device is connected at the output port of the antenna and is capable of responding at a frequency of an externally-applied optical field and having its impedance at the optical frequency changed by an applied electrical signal.

As explained beginning at line 19 on page 2 of the specification, the present invention addresses the problem that there are no monolithically integrated optical interconnection technologies, so that each has required hybrid construction to route logic signals through a laser driver, laser, waveguide, photodiode, and transimpedance amplifier chain. Moreover, as described at lines 5-9 of page 3, there is a separate laser or modulator provided for each fiber or waveguide, thereby requiring that each line have at least one component mounted on the circuit board or chip.

In contrast, as explained beginning at line 7 of page 6, the present invention offers a number of advantages, including the capability of using a single common laser and driver

circuit for a plurality of interconnects, thereby providing savings in chip real estate, extremely large bandwidths and near-zero latency, considerable power savings, and the capability of manufacture entirely in monolithic silicon circuitry.

Moreover, the present invention is unlike an ordinary antenna that must couple into free-space waves. Rather, the present invention, although called an “antenna”, is perhaps technically better described as a “waveguide to conductor coupling”, since it does not address the free-space propagation purpose.

## **II. THE PRIOR ART REJECTION**

The Examiner alleges that Modell renders obvious the present invention. Applicants submit, however, that there are elements of the claimed invention which are neither taught nor suggested by Modell.

Although the same word “antenna” is used for both the present invention and the prior art described in Modell, they are not the same devices, although the popular word “antenna” could be used for both. The present invention would be just as properly described more technically as being a “waveguide to conductor coupling structure.”

In contrast, Modell’s antennas are not described as being anything except free-space devices, in the normal sense of the word “antenna.”

The antenna of the present invention is much more like a waveguide-to-coax adapter than like rabbit ears and would not be much use in free space. Nowhere does Modell describe nor claim waveguides and his devices are based on two-layer tunnel barriers and are not interchangeable with the antennas of the present invention.

Because of this basic difference in environments and interface capability, the rejection based on Modell is inherently deficient in failing to satisfy the plain meaning of the claim language, specifically that of satisfying the interface with a waveguide. The rejection currently of record fails to point to any location in Modell that addresses these clauses in the independent claims, and the locations to which the Examiner points clearly fail to satisfy this interface description.

The Examiner attempts to address this lack in Modell of a waveguide interface in Paragraph 13 on page 5 of the Office Action by merely alleging that “... waveguides are well known in the art for providing low loss propagation of optical signals.” Applicants submit that, even assuming this statement is true, the rejection currently of record fails to address the

basic deficiency of an antenna that interfaces with a waveguide. The Examiner's statement is merely a description of the conventional use of waveguides to conduct optical signals.

That is, it is one thing to state that waveguides provide low loss propagation of optical signals, but it is something else entirely different to extend this statement to the interface between an antenna and a waveguide, since, as clearly described earlier in the summary in the section above, the conventional technologies fail to provide a monolithically integrated optical interconnection technology that permits electronic logic or other control signals through optical components.

As clearly shown in Figure 3 and described beginning at line 13 of page 12, the exemplary structure 300 of the present invention includes antenna structures 310, 340 that are actually contacting a waveguide material 320, and Figure 4 shows how the electronic signal is then interfaced with the antenna elements 310, 340. Therefore, because of this waveguide interface, the present invention clearly differs from the antenna taught in Modell.

In order to meet the initial burden of a *prima facie* rejection, the Examiner would have to demonstrate a prior art reference (properly combinable with Modell) showing an antenna structure that interfaces with an optical waveguide. This burden is not satisfied by merely describing that waveguides are known in the art as used to propagate optical signals.

Hence, turning to the clear language of the claims, in Modell there is no teaching or suggestion of: "... apparatus for producing a modulated optical signal in a waveguide, comprising: an antenna for communicating with the waveguide and with an externally-applied optical field ...", as required by independent claim 1. The remaining independent claims have similar language and concepts.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggested by Modell. Therefore, the Examiner is respectfully requested to withdraw this rejection.

### **III. FORMAL MATTERS AND CONCLUSION**

In view of the foregoing, Applicant submits that claims 1-47, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance,

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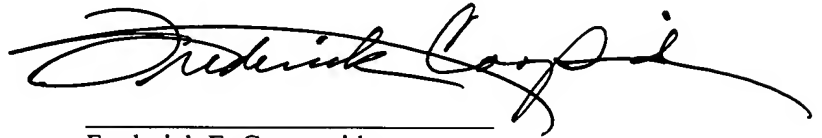
the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

Date: \_\_\_\_\_

12/16/05



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